OPERATING SUMMARY

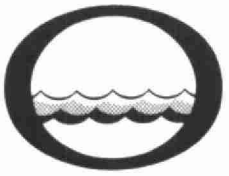
NEPEAN

water pollution control plant

1968

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations



Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.

D. S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

NEPEAN

water pollution control plant

operated for

THE TOWNSHIP OF NEPEAN

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

CONTENTS

'68 REVIEW

The cost of operating the Township of Nepean Water Pollution Control Plant and pumping stations was $55,366.99 or $72.11 per million gallons. The operating costs exceeded the 1968 budget of $42,335.00 by $13,031.99. The costs were higher in 1968 due to the critical operation in the summer months when additional staff was hired and additional costs incurred.

The average flow to the Township of Nepean Water Pollution Control Plant in 1968 was 2.10 mgd. This represents a decrease of 25 percent from the 1967 average flow of 2.81 mgd. This reduction is primarily the result of the diversion of a portion of the Township of Nepean sewage to the City of Ottawa system in July, 1968. Flows increased in December, 1968, due to the connection of the "Tri-Party Trunk" sewer to the Township of Nepean trunk sewer.

An extension of plant facilities was completed in May, with the addition of two final settling tanks and supplementary sludge return pumps.

A piston pump was installed to improve the pumping of digested sludge. Pumping had been troublesome with the originally installed centrifugal pump.

Modifications were also made to the Wallace & Tiernan chlorinator to increase its capacity to 400 pounds of chlorine per day.

Flows exceeded the capacity of the Woodroffe Avenue pumping station for a lengthy period of time in the spring, and large accumulations of grease collected in the wet well. Considerable difficulty in the removal of the grease was experienced as the compacted grease would support the weight of a diver. A Gorman-Rupp pump was transferred from the Crestview pumping station, which is owned and operated by the Township. A temporary 12 inch forcemain was constructed. Initially, the flow was directed to the Township of Nepean trunk sewer but later was diverted to the City of Ottawa system at the intersection of Baseline Road and Woodroffe Avenue.

Because of the heavy flows to the plant, a temporary 14 inch diameter forcemain and a rented pump were installed at the Shirley's Bay pumping station.

Hydrogen sulphide odour complaints were received on two occasions from residents of Ottawa living on Woodroffe Avenue north of Baseline Road. Samples were collected on both occasions but the exact source of the problem could not be isolated, even though the odour was evident in the Woodroffe Avenue wet well.

Because of the increase in pumping equipment and the critical nature of the operation, additional temporary staff was hired to cope with the additional load placed on operating personnel.

PROJECT COSTS

2-0035-59

NET CAPITAL COST (Final)	$1,444,574.46
DEDUCT - Payments from Municipalities	670,000.00
Long Term Debt to OWRC	$ 774,574.46
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968	$ 130,288.62
Net Operating	$ 55,366.99
Debt Retirement	15,631.00
Reserve	8,909.42
Interest Charged	43,487.26
TOTAL	$ 123,394.67

RESERVE ACCOUNT

Balance at January 1, 1968	$ 31,632.29 8
Deposited by Municipality	8,909.42
Interest Earned	1,972.12
	$ 42,513.83
Less Expenditures	2,301.79
Balance at December 31, 1968	$ 40,212.04

2-0076-61

NET CAPITAL COST (Final) Long Term Debt to OWRC	$160,984.91
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968	$ 27,713.86
Net Operating	$ -
Debt Retirement	3,249.00
Reserve	722.08
Interest Charged	9,038.25
TOTAL	$ 13,009.33

RESERVE ACCOUNT

Balance at January 1, 1968	$ 6,817.86
Deposited by Municipality	722.08
Interest Earned	419.36
	$ 7,959.30
Less Expenditures	-
Balance at December 31, 1968	$ 7,959.30

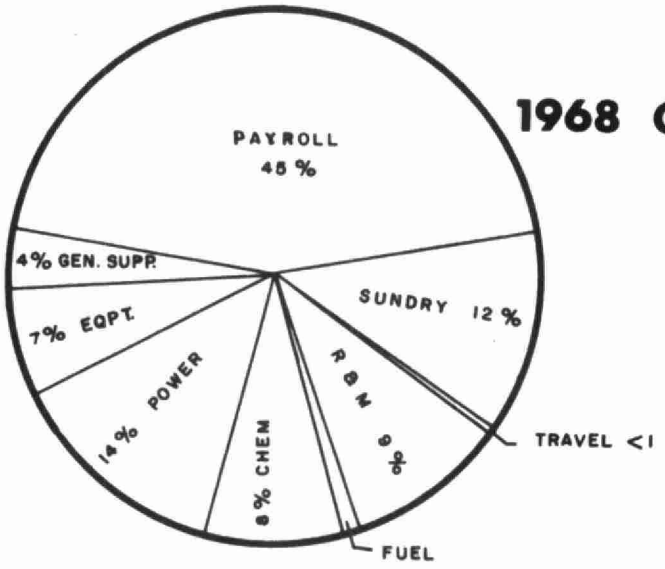
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAY ROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	1475.78	1341.76	-	-	-	-	26.16	-	85.00	22.86	-	-
FEB	3214.27	1325.27	-	99.75	43.15	-	182.33	342.44	504.26	23.41	-	93.66
MAR	3011.80	2165.31	-	102.60	556.27	-	78.20	-	3.52	105.90	-	-
APRIL	2450.57	1284.57	-	117.56	571.60	-	269.58	-	181.64	25.62	-	-
MAY	3011.33	1391.23	-	99.75	630.21	477.23	164.46	(78.44)	66.00	260.89	-	-
JUNE	3231.60	1361.92	69.02	-	620.34	520.53	97.96	307.38	209.51	44.94	-	-
JULY	2942.22	1308.96	620.70	-	627.06	95.45	113.85	73.18	-	103.02	-	-
AUG	5124.25	1999.72	1236.14	-	753.69	-	125.82	-	969.88	39.00	-	-
SEPT	7024.34	1596.18	720.45	-	703.98	-	162.24	349.67	1414.51	2077.31	-	-
OCT	7363.29	1352.56	675.56	-	605.06	477.23	391.98	1668.04	665.84	1505.18	-	21.84
NOV	7510.91	1345.43	738.47	-	1057.39	2386.16	249.71	-	95.73	1559.37	-	78.65
DEC	9006.63	3536.45	674.34	-	748.70	620.40	544.89	985.50	1023.40	872.95	-	-
TOTAL	55366.99	20009.36	4734.68	419.66	7517.45	4577.00	2407.18	3647.77	5219.29	6640.45	-	194.15

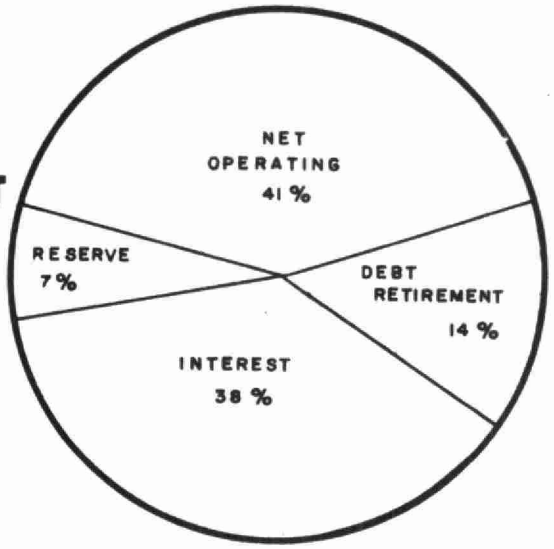
BRACKETS INDICATE CREDIT

CT

1968 OPERATING COSTS



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1964	726.4	$31,159.12	$42.89	7 cents
1965	886.1	32,490.61	36.67	9 cents
1966	1010.5	33,588.90	33.24	16 cents
1967	1025.1	45,317.05	44.21	20 cents
1968	767.82	55,366.99	72.11	14 cents

Process Data

PLANT FLOWS & CHLORINATION

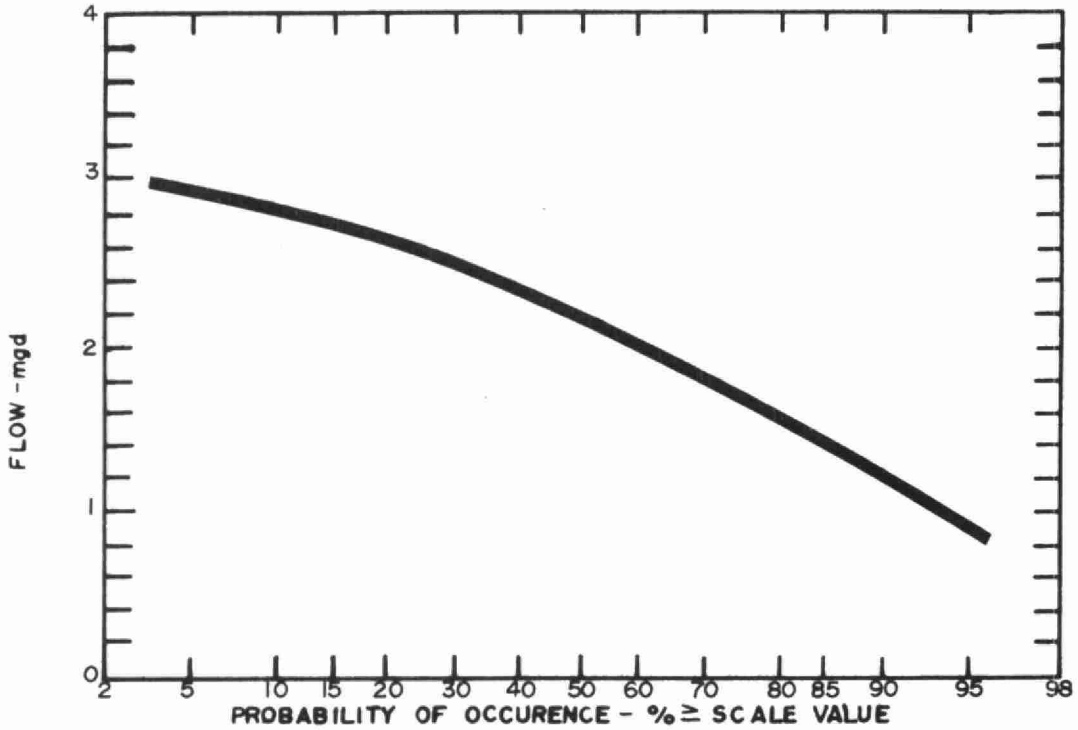
A total of 767 million gallons of raw sewage was received at the plant in 1968. This is equivalent to 2.1 million gallons per day. The average daily flow to the plant for the first seven months of the year averaged 2.5 million gallons per day. This was considerably reduced when the Woodroffe Avenue pumping station pumped a portion of the flows to the City of Ottawa sewage system.

In December, 1968, the flows increased; this was due primarily to the connection of the "Tri-Party Trunk" sewer to the Township of Nepean trunk sewer. The maximum daily flow of 3.16 million gallons per day was received in November and the minimum average daily flow of 0.13 mg was received in September.

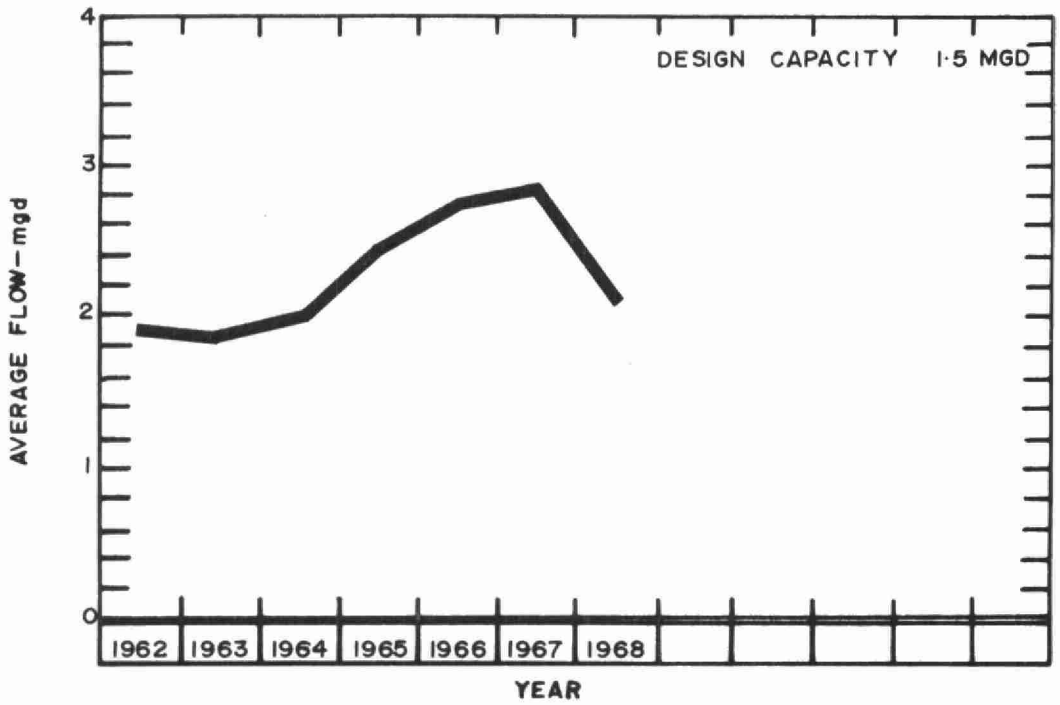
Chlorination was practised at the plant from May 15 to October 28. A dosage of 4.27 mg/l of chlorine was required to obtain a chlorine residual of 0.5 mg/l after a retention period of 15 minutes.

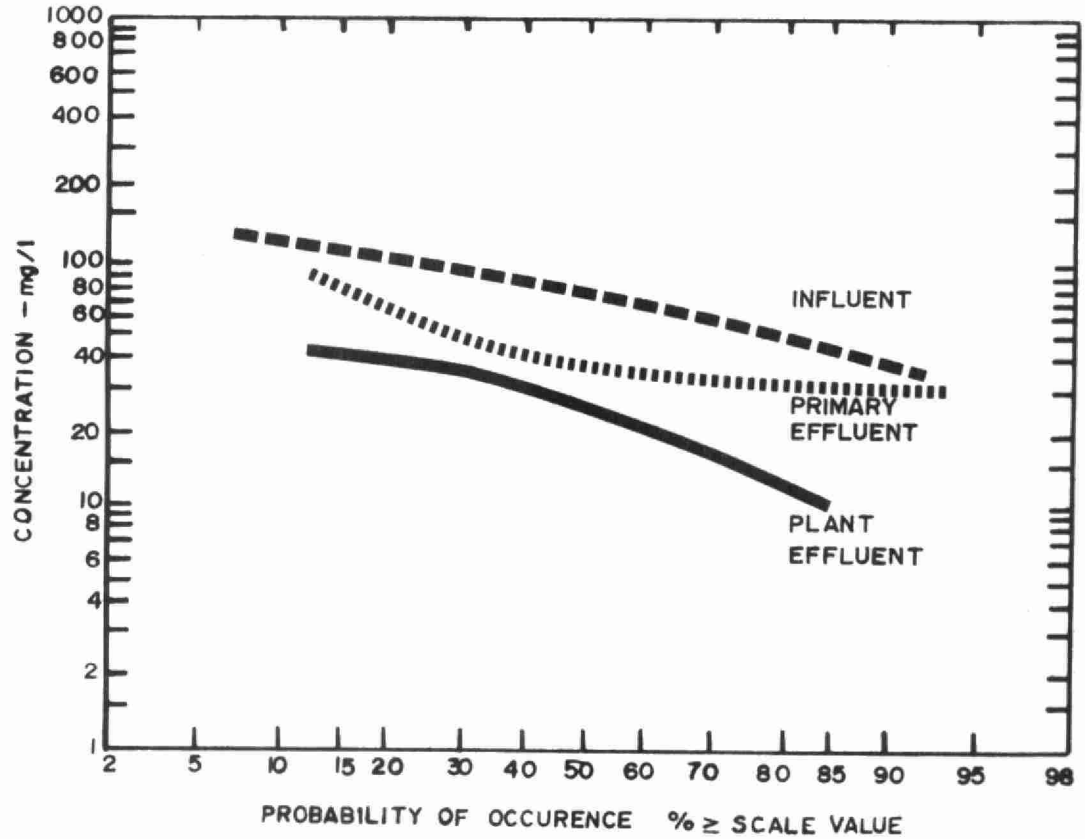
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED 10^3 lbs.	DOSAGE mg/l
JAN	68.40	2.21	2.65	1.84	0	-
FEB	60.09	2.07	2.69	1.13	0	-
MAR	68.20	2.20	2.88	1.49	0	-
APR	78.11	2.60	2.85	2.32	0	-
MAY	78.54	2.53	2.67	2.15	1.99	4.9
JUN	72.85	2.43	2.77	2.12	3.44	4.7
JUL	74.78	2.41	2.76	1.88	3.88	5.2
AUG	50.43	1.63	2.88	.41	6.38	12.6
SEPT	43.02	1.43	4.21	.13	5.01	11.7
OCT	41.51	1.34	2.18	.72	4.89	13.0
NOV	53.30	1.78	3.16	1.19	0	-
DEC	78.59	2.54	3.12	1.57	0	-
TOTAL	767.82	-	-	-	25.59	-
AVERAGE	-	2.10	-	-	4.27	7.1

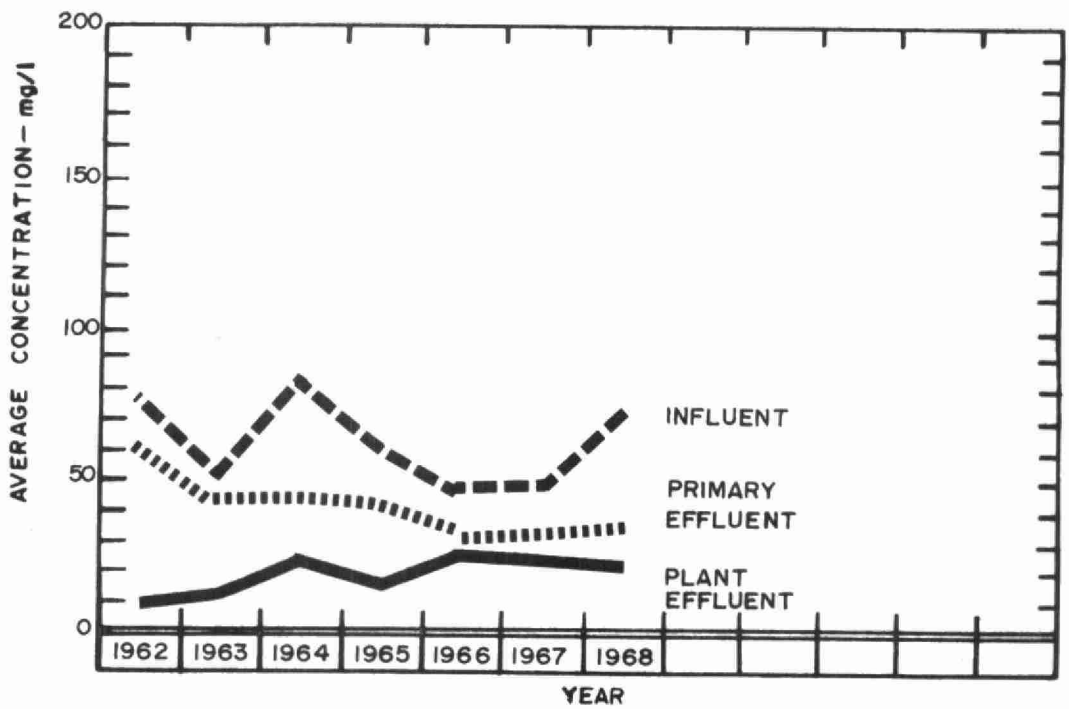

FLOW - mgd
0
1
2
3
4
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

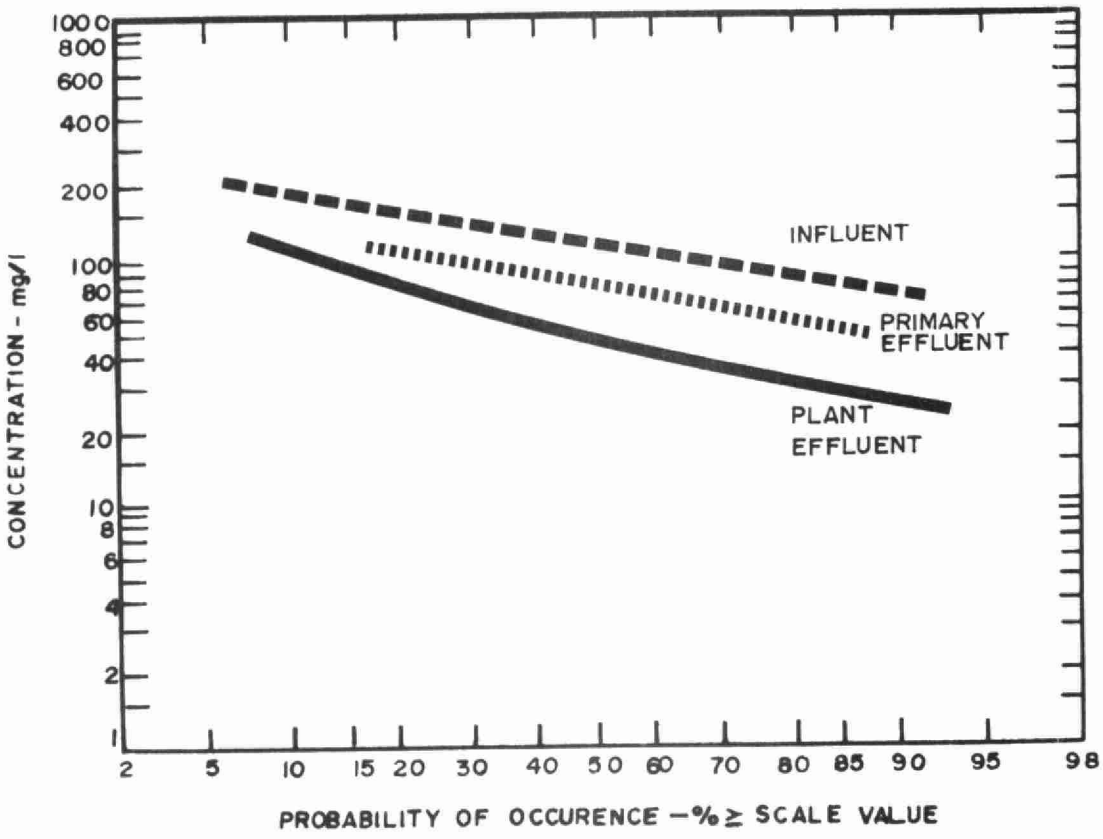
FLOWS


AVERAGE FLOW - mgd
0
1
2
3
4
DESIGN CAPACITY 1·5 MGD
1962
1963
1964
1965
1966
1967
1968
YEAR

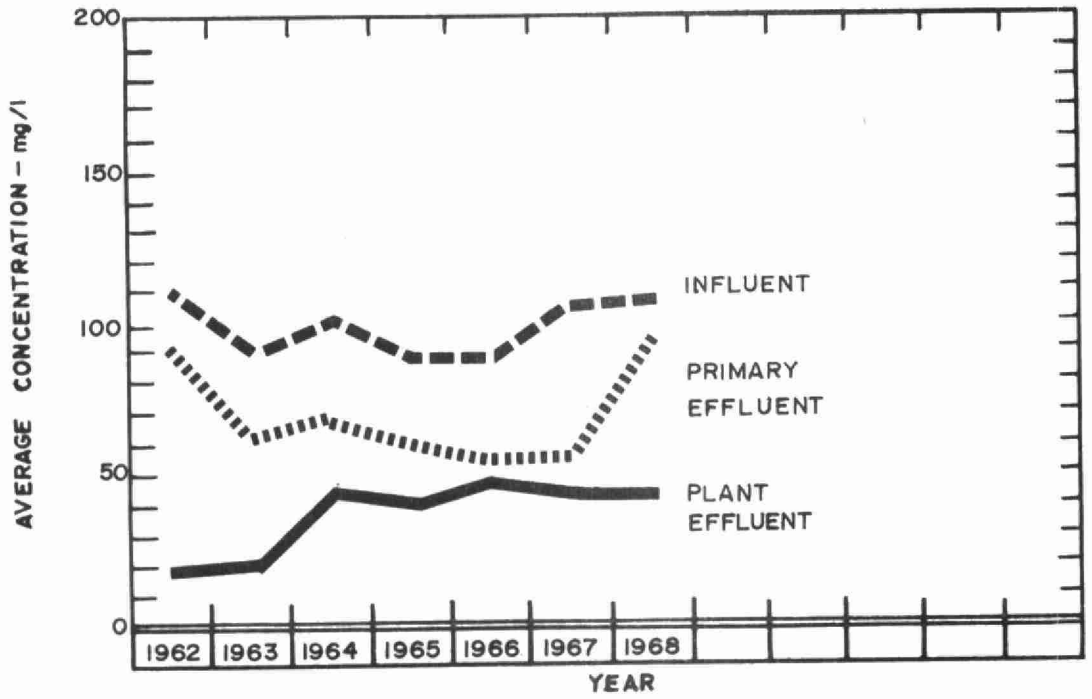


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC^N mg/l	EFF CONC^N mg/l	RED^N %	REMOVAL 10^3 lb	INF CONC^N mg/l	EFF CONC^N mg/l	RED^N %	REMOVAL 10^3 lb	REMOVAL ft^3
JAN	82	29	64	36.3	111	74	33	25.3	0
FEB	88	23	74	39.1	123	34	72	53.5	0
MAR	47	38	19	6.1	143	117	18	17.7	0
APR	36	34	6	1.6	68	68	0	0	0
MAY	110	34	69	59.7	72	58	19	11.0	0
JUN	115	40	65	54.6	140	63	55	56.1	45
JULY	-	-	-	-	-	-	-	-	672
AUG	63	12	81	25.7	144	15	90	65.1	432
SEPT	37	7	82	12.6	96	17	82	34.0	36
OCT	84	5	94	32.8	96	19	80	32.0	88
NOV	90	8	91	43.7	72	6	92	35.2	0
DEC	62	10	84	40.9	107	18	83	70.0	0
TOTAL	-	-	-	-	-	-	-	-	1273
AVERAGE	74	22	70	32.1	107	44	59	36.3	106

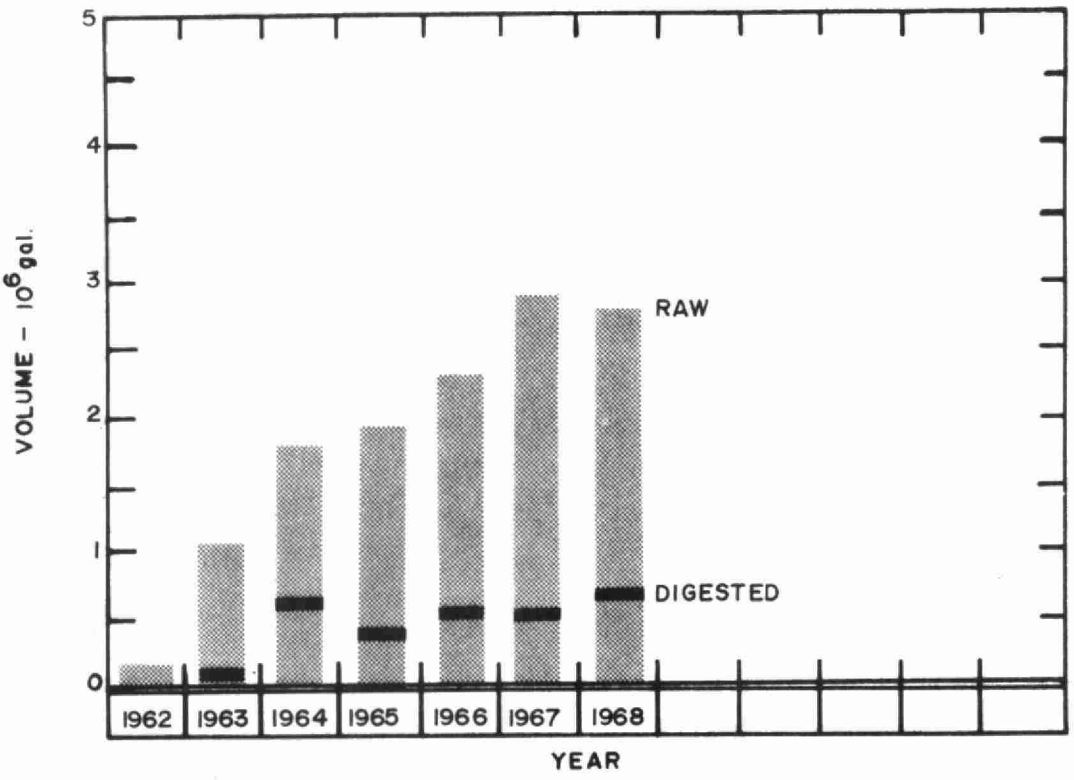
COMMENTS

The average strength of BOD and suspended solids in the raw sewage was 74 and 107 mg/l. The average strength of BOD and suspended solids in the plant effluent was 22 and 44 mg/l respectively. This resulted in an average percent removal of the BOD and suspended solids of 70 and 59.

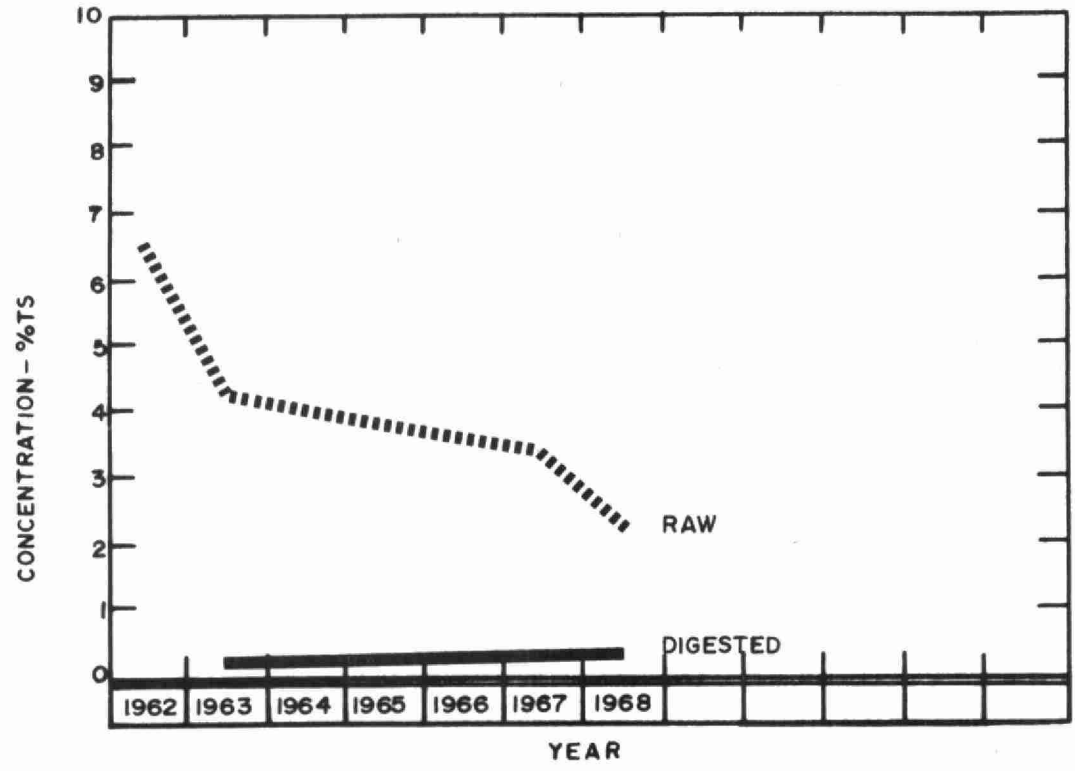
It should be noted that the strength of the BOD and suspended solids in the plant effluent decreased considerably after July when the flows to the plant were reduced and the additional settling tanks put into operation. The results were based on composite samples collected at the plant and submitted to the OWRC Laboratory for analyses. The total quantity of BOD and suspended solids removed from the waste in 1968 was 176 and 199 tons respectively.

The average concentration of BOD and suspended solids in the plant effluent exceeded the OWRC objectives owing to heavy hydraulic overloading. The average loading to the aeration section was 15 pounds of BOD/100 pounds of mixed liquor suspended solids. This is low, however, and changed very little from the previous year. The average concentration of mixed liquor suspended solids was 1830 mg/l.

A total quantity of 2.87 million gallons of raw sludge was pumped from the primary tanks to the digester. Approximately 0.68 mg of digested sludge was removed from the digester and pumped to the sludge lagoons south of the plant for further dewatering.


VOLUME - 10^6 gal.
5
4
3
2
1
0
RAW
DIGESTED
1962
1963
1964
1965
1966
1967
1968
YEAR

DIGESTION


CONCENTRATION - %TS
10
9
8
7
6
5
4
3
2
1
0
RAW
DIGESTED
1962
1963
1964
1965
1966
1967
1968
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^5 gal	T. S. %	V.S. %	VOLUME 10^5 gal	T. S. %	V.S. %	VOLUME 10^5 gal	T. S. %	LIQUID yd^3	DEWATERED yd^3
JAN	2.75	.5	-	.71	-	-	-	-	0	0
FEB	2.46	-	-	.58	-	-	-	-	0	0
MAR	2.53	5.8	35	0	-	-	-	-	0	0
APR	2.23	3.8	-	0	.2	50	-	-	0	0
MAY	2.60	.4	63	.21	.3	50	-	-	0	0
JUN	.17	-	-	0	-	-	-	-	0	0
JUL	3.20	-	-	.98	-	-	-	-	0	0
AUG	2.94	-	-	1.42	-	-	-	-	0	0
SEPT	2.29	-	-	.58	-	-	-	-	0	0
OCT	2.52	2.9	61	.86	-	-	-	-	0	0
NOV	2.40	1.5	-	.63	.5	52	1.0	-	0	0
DEC	2.57	.1	-	.81	-	-	1.2	-	0	0
TOTAL	28.76	-	-	6.78	-	-	-	-	0	0
AVERAGE	2.40	2.2	53	0.56	.4	51	1.1	-	0	0

AERATION

MONTH	AVERAGE FLOW mgd	PRIMARY EFF BOD CONC^N mg/l	PRIMARY EFF SS CONC^N mg/l	SECONDARY EFF BOD CONC^N mg/l	SECONDARY EFF SS CONC^N mg/l	ML SS CONC^N mg/l	F/M (lb BOD / lb ML SS)	AIR USED (1000 ft / lb BOD REMOVED)	WASTE SLUDGE 10^5 lb
JAN	2.21	72	84	29	74	1,110	.36	-	-
FEB	2.07	60	71	23	34	1,250	.30	-	-
MAR	2.20	34	107	38	117	1,080	.17	-	-
APRIL	2.60	26	46	34	68	-	-	-	-
MAY	2.53	32	41	34	58	-	-	-	-
JUN	2.43	60	72	40	63	-	-	-	-
JUL	2.41	-	-	-	-	2,320	-	-	.21
AUG	1.62	21	48	12	15	2,760	.03	-	1.00
SEPT	1.43	26	81	7	17	2,860	.03	-	.98
OCT	1.34	28	375	5	10	1,980	.05	-	.35
NOV	1.78	25	57	8	6	1,880	.06	-	.60
DEC	2.54	34	55	10	18	1,250	.18	-	1.13
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	2.10	38	94	22	44	1,830	.15	-	.71

Water management in Ontario